

# Does Chlorhexidine Improve Periodontal Health and Bacterial Profiles in Patients with Special Health Care Needs? A Systematic Review and Meta-Analysis



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## Background

Patients with special health care needs (SHCN) experience a disproportionately high burden of plaque accumulation and gingival inflammation, largely due to physical, cognitive, and behavioral limitations that interfere with effective mechanical plaque control. As a result, adjunctive chemotherapeutic agents such as chlorhexidine (CHX) are frequently used in an effort to improve oral hygiene outcomes in this population.

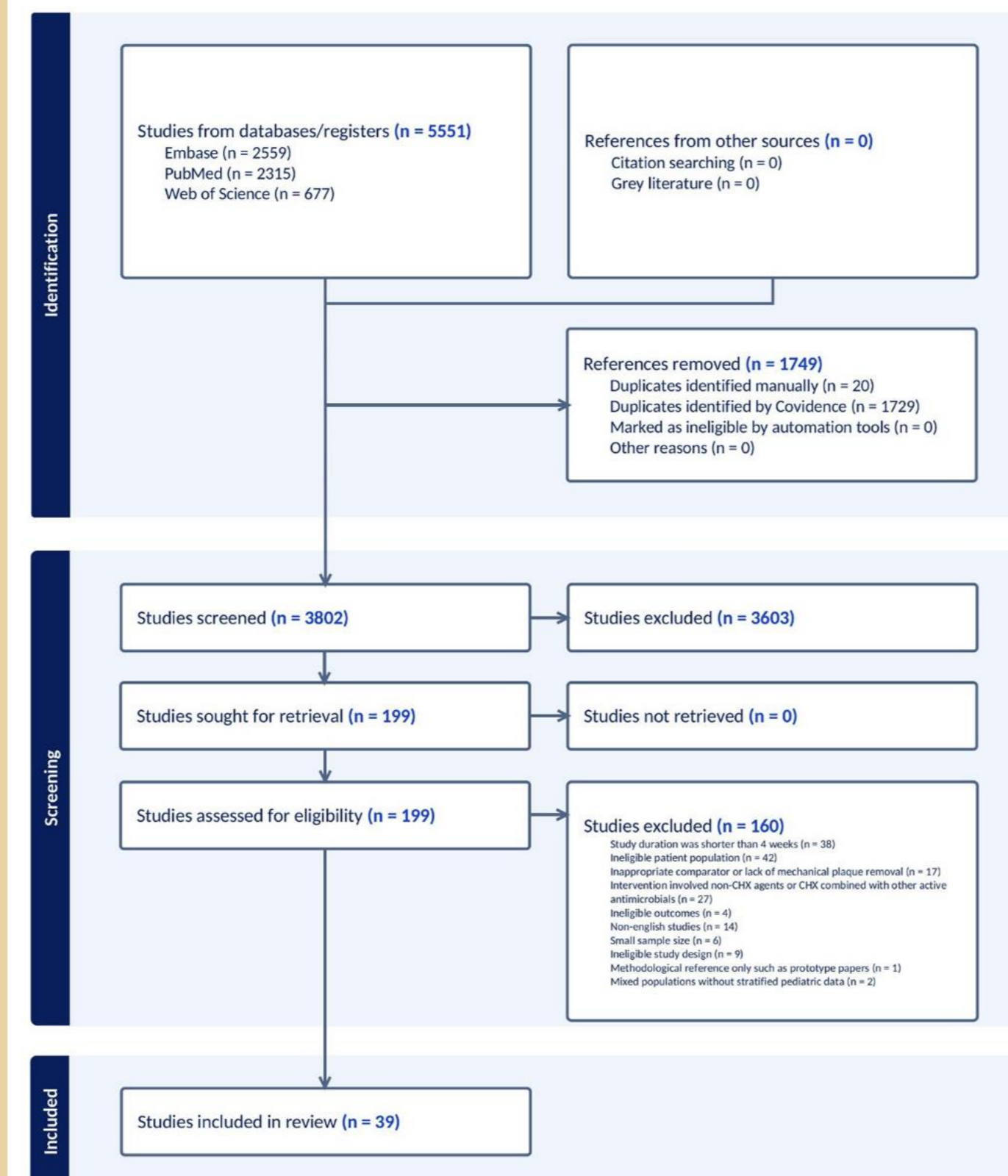
While the effectiveness of CHX has been well documented in the general population, its benefits, tolerability, and clinical relevance in patients with SHCN have not been systematically evaluated.

## Purpose

The purpose of this systematic review and meta-analysis was to assess the effectiveness of CHX-containing products as adjuncts to mechanical oral hygiene in improving periodontal outcomes in patients with SHCN.

## Methods

This systematic review and meta-analysis was conducted in accordance with PRISMA guidelines and registered with PROSPERO (CRD420251003198). A comprehensive electronic search of PubMed, Embase, and Web of Science was performed for studies published between January 1945 and December 31, 2024. Randomized controlled trials evaluating the effects of CHX-containing products in patients with SHCN were eligible for inclusion. Primary outcomes included changes in plaque index (PI) and gingival index (GI), while secondary outcomes included reported adverse effects and changes in oral bacterial profiles. A random-effects meta-analysis was performed using Hedges' g for plaque outcomes and mean differences for gingival outcomes. Risk of bias was assessed using the Cochrane RoB 2 tool, and the overall quality of evidence was evaluated using the GRADE framework.



PRISMA flow diagram illustrating study identification, screening, eligibility, and inclusion for the systematic review and meta-analysis.

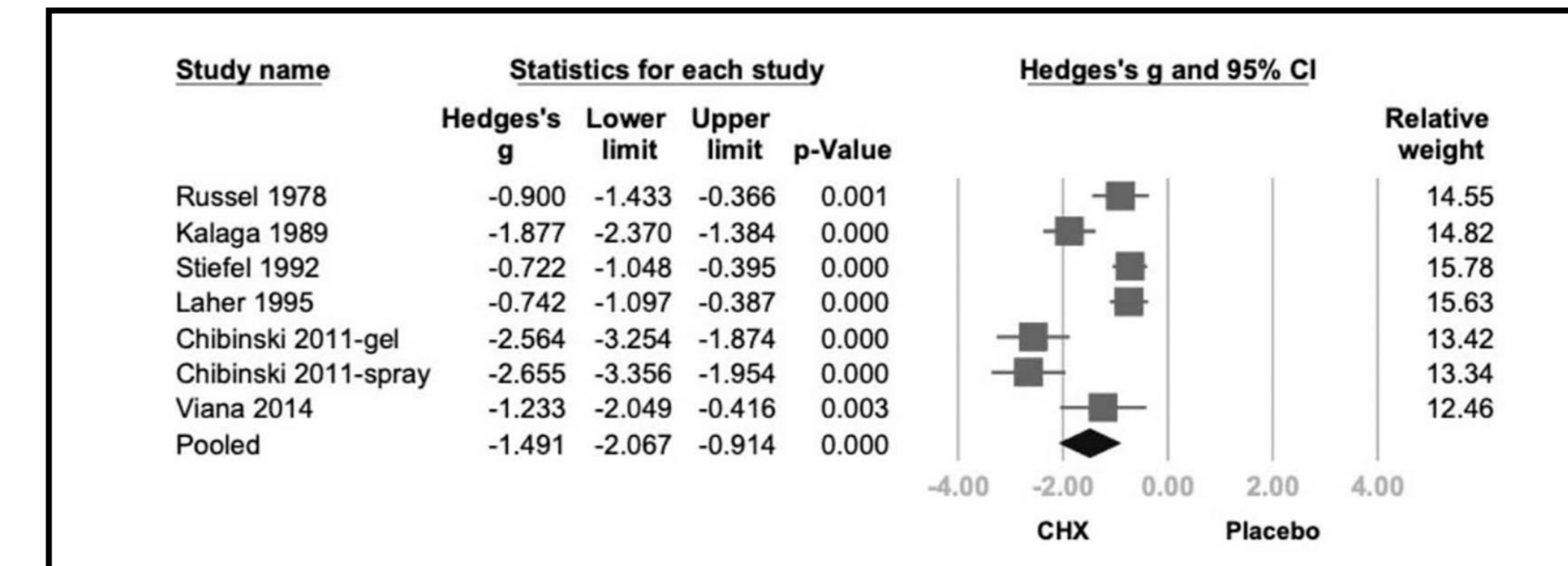
## Results

Study ID	D1	D2	D3	D4	D5	Overall
Pannuti et al. (2003)	+	+	+	-	+	-
Chibinski et al. (2011)	+	+	+	+	+	+
Kalaga et al. (1989)	+	+	+	+	+	+
Lotufo et al. (2003)	+	+	+	+	-	+
LaHer and Cleaton (1995)	+	+	+	+	+	+
Cutress et al. (1977)	-	+	+	+	+	-
Chikie et al. (1991)	+	+	+	+	+	+
Viana et al. (2014)	+	+	+	+	+	+
Russell et al. (1978)	-	-	+	-	+	-
Bay et al. (1975)	-	+	+	-	+	-
Stiefel et al. (1992)	+	+	+	+	+	-
Gallagher et al. (1977)	-	-	+	-	+	-

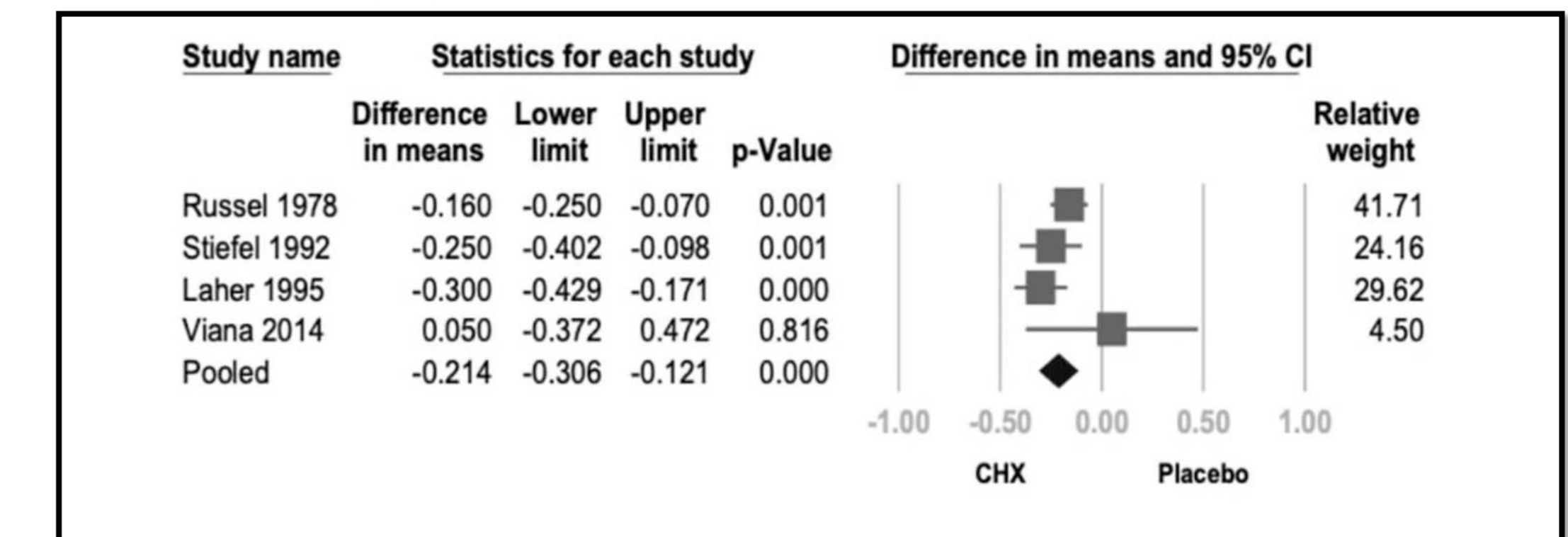
Legend  
 + : Low risk  
 - : High risk  
 - : Some concerns

ROB-2 Domains  
 D1: Randomisation process  
 D2: Deviations from the intended interventions  
 D3: Missing outcome data  
 D4: Measurement of the outcome  
 D5: Selection of the reported result

Summary of risk of bias assessment for included randomized controlled trials using the Cochrane Risk of Bias 2 (RoB 2) tool.



Forest plot of the effects of CHX on PI as compared with the placebo. CHX was found to be effective in reducing PI. CHX, chlorhexidine; CI, confidence interval; PI, plaque index.



Forest plot of the effects of CHX on GI as compared with the placebo. CHX was found to be effective in reducing GI. CHX, chlorhexidine; CI, confidence interval; GI, gingival index.

## Conclusions

- Our findings support **short-term chlorhexidine use (2–6 weeks)**, with **4–6 weeks representing a clinically practical duration that balances efficacy and tolerability**.
- Chlorhexidine use was associated with **significant reductions in plaque accumulation and gingival inflammation** in patients with special health care needs compared with mechanical oral hygiene alone.
- The **most consistent clinical benefit** was observed with **0.2% chlorhexidine formulations**, particularly when delivered via **spray or topical application**, which may improve feasibility in pediatric and special care populations.
- Adverse effects**, including tooth staining and taste alteration, were **common but generally mild, localized, and reversible**, with **no serious systemic complications** reported.
- These findings support the **professionally supervised, time-limited use** of chlorhexidine as an adjunctive therapy for patients with special health care needs who have difficulty maintaining adequate mechanical plaque control.
- Prolonged use beyond 8 weeks should be avoided** unless carefully monitored due to increasing risk of adverse effects.

